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* All dollar ($) amounts refer to US dollars.

Cover Photo: © Valerie Giles/thebiggerpicture
Shed scorpion skin. The exoskeleton of arthropods protects and supports the animal's internal organs and musculature. Periodically, arthropods must go through the process of ecdysis, molting their exoskeleton to accommodate growth of the body.

UNEP promotes environmentally sound practices globally and in its own activities. This magazine is printed on 100% recycled paper, using vegetable-based inks and other eco-friendly practices. Our distribution policy aims to reduce UNEP's carbon footprint.

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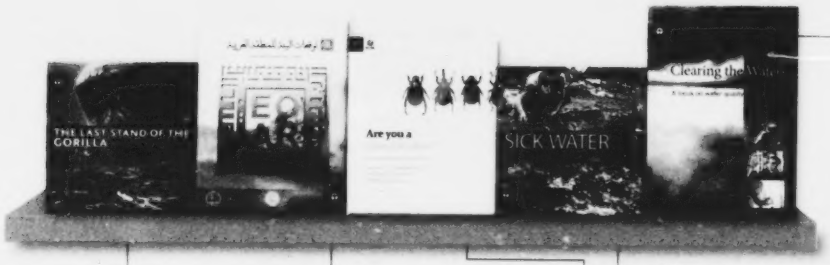


The Last Stand of the Gorilla – Environmental Crime and Conflict in the Congo Basin

A UNEP rapid response assessment report, this publication exposes the escalating threat to gorillas across the Greater Congo Basin from poaching for bushmeat, habitat loss and natural epidemics such as ebola. Alarmingly, the report indicates that militias are behind much of the illegal bushmeat trade, and estimates of the animal's range are significantly less than in earlier studies. It presents a series of recommendations for addressing threats to gorillas in the region.

The Environment Outlook for the Arab Region: Environment for Development and Human Well-being

The Environment Outlook for the Arab Region is the first official, comprehensive, and integrated assessment of the state of the environment in the Arab region. It is a credible, scientific assessment that provides a base for policy formulation in the region. The report was prepared in response to a decision by the Council of Arab Ministers Responsible for the Environment in its 17th session, held at the headquarters of the Secretariat-General of the League of Arab States, in Cairo, Egypt, in December 2005.

Are you a Green Leader? Business and Biodiversity: Making the Case for a Lasting Solution

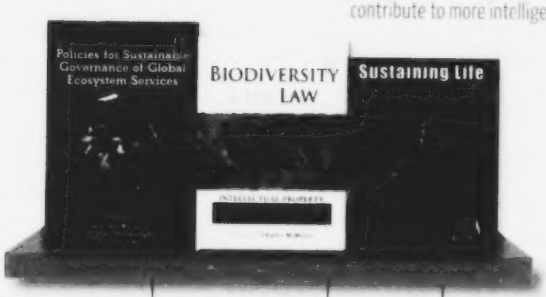
Aimed at businesses and organizations that work with the private sector, this publication explores the link between biodiversity and business, highlights best practices and encourages businesses to engage with biodiversity issues. It provides a global snapshot of major biodiversity impacts, efforts and future challenges in a number of key industry sectors – mining, energy, agrifoods and fisheries, construction and forestry, tourism, pharmaceuticals, cosmetics, fashion and finance – that depend or have an impact on biodiversity and ecosystem services.

Cleaning the Waters: A Focus on Water Quality Solutions

This publication conveys the urgency of controlling pollution and preserving water quality around the world. Marking an international change of focus from water quantity to the importance of water quality for satisfying human and environmental needs, it presents an overview of water quality challenges and issues and uses case studies to illustrate both problems and solutions. The book emphasizes water quality solutions and strategies for water quality institutions, pollution prevention, water treatment and ecological restoration. Key findings and policy recommendations are provided.

Sick water? The central role of wastewater management in sustainable development

This publication addresses the challenges posed by illegal and unregulated wastewater, which present a global threat to human health and well-being. The report identifies the threats to human and ecological health and the consequences of inaction on this issue. It also outlines appropriate policy and management responses over the short term and longer term that can trigger employment opportunities, support livelihoods, boost public and ecosystem health and contribute to more intelligent water management.



Policies for Sustainable Governance of Global Ecosystem Services

Edited by Janet Ranganathan, Mohan Munasinghe and Frances Irwin (Edward Elgar Publishing)

This book provides a compilation of policy, institutional and governance recommendations from 18 leading international experts, to respond to the Millennium Ecosystem Assessment (MEA) finding that over the last 50 years humans have degraded ecosystem services at a faster rate and on a larger scale than at any time in human history. The contributors review the MEA findings and define a global action agenda for governments, businesses, international organizations, civil society and research organizations.

Biodiversity and the Law: Intellectual Property, Biotechnology and Traditional Knowledge

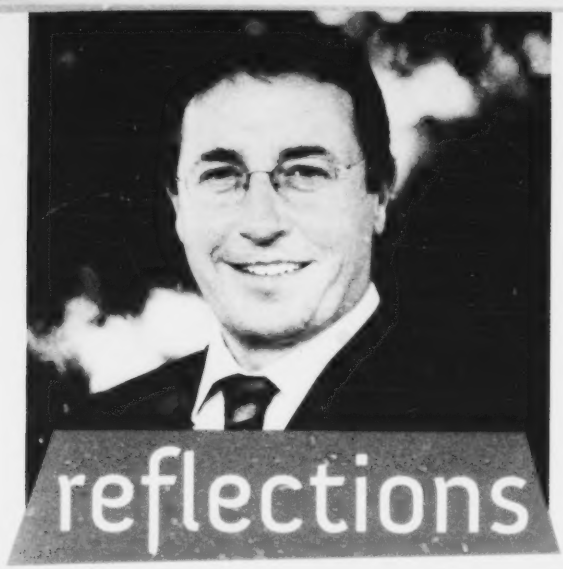
Edited By Charles R. McManis (Earthscan)

This book addresses the question: how do we promote global economic development while simultaneously preserving local biological and cultural diversity? Its 50 contributors examine biodiversity, its loss and what is to be done; whether biotechnology is part of the problem or part of the solution; traditional knowledge and how, if at all, it should be protected; and the practical lessons learned in relation to ethnobotany and bioprospecting.

Sustaining life: how human health depends on biodiversity

Edited by Eric Chivian and Aaron Bernstein (Oxford University Press USA)

Sustaining Life examines the full range of potential threats that biodiversity loss poses to human health. Written by Harvard Medical School physicians, it is a comprehensive view of how human medicines, biomedical research, the emergence and spread of infectious diseases, and the production of food, both on land and in the oceans, depend on biodiversity. Case studies illustrate the contributions that a wide range of organisms have already made to human medicine, and those they are expected to make if we do not drive them to extinction.



reflections

ACHIM STEINER

UN Under-Secretary-General and Executive Director, UNEP

Climate change has been described as the biggest market failure of all time, but loss of biodiversity and of nature's economically important services must surely be running it close, if not equalling it. Year in and year out, the world economy may be losing $2.5 to $4.5 trillion-worth of natural capital as a result of deforestation alone, quite apart from the cost of the losses of other key ecosystems.

Decisive action must be taken to reverse these declines or the bill will continue to climb. And, at the same time, the chance will disappear of fully achieving the poverty-related Millennium Development Goals and of ushering in a sustainable 21st century for six billion people, rising to nine billion by 2050.

Governments mobilized stimulus packages worth over $3 trillion, seemingly overnight, in response to the recent financial and economic crisis. Where are the same stimulus and the same coordinated international political response to address the crisis facing our natural and nature-based assets?

The ground breaking Economics of Ecosystems and Biodiversity (TEEB), hosted by UNEP, attempts to crystallize and illuminate new answers and assist towards decisive choices. Its landmark report is to be published to inform governments' decisions in advance of the Convention on Biological Diversity's meeting in Nagoya, Japan, later this year. But many inspiring and potentially transformational facts and figures are already emerging, as are more creative management options.

Let me cite one example that underlines TEEB's framing of the debate. Subsidized commercial shrimp farms can generate returns of around $1,220 per hectare by clearing mangrove forests. But TEEB shows that this does not take into account costs to local communities — linked with losses of wood and non-wood forest products, fisheries and coastal protection services — totalling over $12,000 a hectare. And the profit to commercial operators similarly neglects the costs to society of rehabilitating the abandoned sites after five years of exploitation — which is estimated at over $9,000 a hectare.

Some countries are rising to the challenge, at least in part.

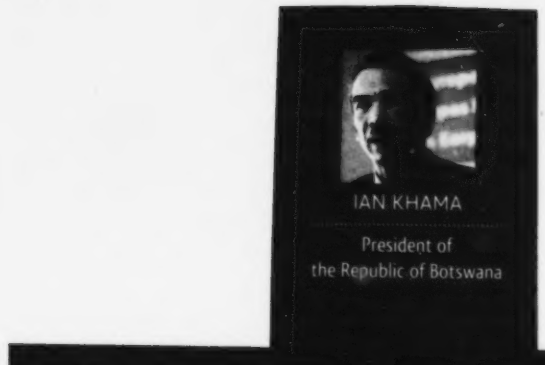
- Planting and protecting nearly 12,000 hectares of mangroves in Vietnam costs just over $1 million but saves annual expenditures on dyke maintenance of well over $7 million.
- One in 40 jobs in Europe is now linked with environment and ecosystem services ranging from clean tech 'eco-industries' to organic agriculture, sustainable forestry and eco-tourism.
- Investment in protecting Guatemala's Maya Biosphere Reserve generates an annual income of close to $50 million a year, and has created 7,000 jobs and boosted local family incomes.

World Environment Day, mainly hosted this year by the country and people of Rwanda, marks a moment in 2010 — the UN International Year of Biodiversity — to re-engage the biodiversity challenge. The public, politicians and business leaders must reconnect with the fundamentals that really drive the global economy, livelihoods and ultimately all our life support systems.

Next time you buy honey from the supermarket or corner shop, reflect on the fact that bees and other pollinators provide services worth perhaps $90 billion a year. Bread and jam would not get to the table were it not for the worms, beetles and bugs that make soils fertile and the multi-trillion dollar agricultural industry possible. The list of similar services is long and legion.

Using smart market mechanisms and bringing visibility to the true value of nature are perhaps the 'missing links' in progressing towards sustainable management. Unless we give economic value to biodiversity — and to ecosystems and the services they provide — we are unlikely to turn the tide in a world fascinated by GDP, stock markets and other measures that define contemporary notions of progress.

Biodiversity is, of course, far more than dollars and cents, Yen, Euros, Yuan or Kenyan shillings — but the economic case for sustainable management of our natural capital needs to be made if we are to design a path away from degradation, destruction and extinction. As TEEB underlines, the economic case is overwhelming and compelling. It is a powerful ally and complement to the traditional case for conservation, centered on stewardship and on respecting the spiritual dimensions of the living world.



IAN KHAMA

President of
the Republic of Botswana

OUR VERY ESSENCE

It's safe to say that when you say the word "Africa" to most people, the images that appear in their minds are something like Botswana.

They will picture waterways alive with blazing-pink flamingos, lazy hippos, ferocious crocodiles and millions of other birds, insects, plants and fish; baking savannah where herds of elephants rest under shady trees and lions, cheetah and wild dogs stalk nimble antelope and zebra; a place where the extraordinary is normal and where, for millennia, people have been learning the secrets of plants and animals that surround them.

Biodiversity is not something that we merely think about in Botswana — it is something that defines our nation and our people, something that gives us our traditions and our history, and a fundamental part of our economy.

The biological diversity of Botswana — which includes us, its people — is the beating heart of our nation, and our deep-rooted understanding of this is part of what makes Botswana an African success story. We respect and care for our resources, and our desire to sustain and maintain the environment that has nurtured us all helps to inform our wider set of sustainable policies. This means that we do not allow rapacious exploitation of our land and its resources and this has helped us to create a healthy economy, a peaceful and effective democracy, good standards of living and a stable society.

Protection of our biodiversity is not some vague cause that we pay lip service to — it is our patriotic duty and our duty to our children. In protecting our biodiversity, we protect the very essence of Botswana and its people. Indeed, the use of biological resources in Botswana is as ancient as human antiquity.

The health of a country's biodiversity is often an indicator of the health of its society. To maintain biological diversity one needs good governance and a holistic and long-term vision for the nation. In Botswana this is what we endeavour to do, and as a result of our pragmatic approach — and unlike many developing nations with an abundance of mineral wealth — we have not fallen prey to the so called "resource curse" where potential wealth generates unrest, inequality, poverty and suffering.

Instead, our diamonds and other minerals — which are, of course, a finite resource — have assisted us in setting in place policies that will help us to continue to thrive even if the revenue from mining diminishes. These polices, naturally, have the protection of our natural and renewable assets — our biological diversity — at their heart.

Tourism is an important and growing part of our national income — accounting directly or indirectly for 10 per cent of our GDP — and this depends on ensuring that Botswana remains beautiful and exciting, which means conserving our stunning wildlife. Agriculture

is still the primary source of income for 80 per cent of our people and, by working to ensure the well-being of our land and biodiversity, we help to reduce the impact of the biggest threat to Batswana people who depend on agriculture — climate change — causing drought and desertification.

In 2004, as signatories to the Convention on Biological Diversity (CBD) we made a commitment to work to ensure the protection of our nation's biodiversity. Our vision was that Botswana should be:

"A nation in balance with nature, with fair access to biological resources, where the benefits deriving from the use of these resources are shared equitably for the benefit and livelihoods of current and future generations, and where all citizens recognize and understand the importance of maintaining Botswana's biological heritage and related knowledge and their role in the conservation and sustainable use of Botswana's biodiversity."

In the CBD meeting that will take place in Nagoya, Japan later this year we are preparing to show that we have followed a path that has helped ensure that we have realised this vision, and will continue to do so. Not only does our biodiversity represent income for the nation now, but there are untapped and unknown benefits in our endemic wildlife that stand to provide the world with new medicines and other new technologies in the future. It is vital that the parties at Nagoya recognize Botswana's right to benefit fairly from the exploitation of these resources — as well as the rights of other nations to benefit from their biological resources.

"The health of a country's biodiversity is often an indicator of the health of its society. To maintain biological diversity one needs good governance and a holistic and long-term vision for the nation."

Botswana's plants and animals are as much of a part of this nation as its people, and it is vital that this biological diversity is protected for future generations — but if the opening decade of the 21st century has taught us anything it is that local problems often require global action.

The conservation of Botswana's natural splendour requires international action on climate change; it needs effective legislation to ensure that where freshwater ecosystems cross national boundaries, the rights of all nations served by these waterways are considered carefully; and it needs pragmatic regulations in place that allow nations to use their wild resources prudently when it can be shown that their stewardship of these resources is effective.

Because we need to address these issues internationally, for more than a decade I have been a member of the board of directors of Conservation International, a major international environmental organization: this helps me to keep my finger on the pulse of international issues that have a bearing on the biodiversity and future of Botswana.

The crux is this. Botswana's people's needs are indivisible from the needs of our land. Botswana is our home, our provider and our pride. In the words of our national anthem: "Fatshe leno la rona" — Blessed be this noble land.

verbatim

"Investment in protected areas holds exceptionally high returns."

Isabelle Autissier, Head of WWF-France

"It is a mistake to believe that the ocean is endless, a giant limitless food cupboard."

Keshav Varma, Programme Director of the Global Tiger Initiative, to delegates at the first Ministerial Conference on Tiger Conservation

"The politics of money is drowning out the weak voices of the tiger and the poor."

"As we approach the 2010 Year of Biodiversity ... the fabric out of which the Earth system is woven is unravelling at an accelerating rate."

Leigh Henry, Senior policy officer TRAFFIC, joint programme of IUCN and WWF

"Without the legal framework to support conservation efforts, we wont succeed."

Bryan Walsh, Time Magazine

"We are literally eating the bluefin tuna to death."

Ms Pat Awori, founder of the Kenya Elephant Forum, ahead of the CITES conference

"If we don't extend the ban to be able to study the impact of these limited sales, there may be no elephants left to protect."

Rosette Chantal Rugamba, Deputy CEO, Rwanda Development Board

"Gorilla conservation is everybody's responsibility."

numbers

129

Total recorded bird extinctions; 103, the number of bird extinctions in the last 200 years — **UNEP**

50

Per cent chance of survival of Australia's Great Barrier Reef if global CO_2 emissions are not reduced by at least 25 per cent by 2020 — **Reuters**

20,000

Black rhinos in Kenya in 1973; 610, the number today — **AP**

8,000,000,000

Estimated annual dollar value of honey bees as pollinators for agricultural crops — **UNEP**

2/3

Estimated decline of tuna stocks over the past 50 years — **AFP**

35

Years since the Convention on the International Trade in Endangered Species of Wild Flora and Fauna came into force

100,000

Tiger numbers at the beginning of the twentieth century; **3,600**, tiger numbers today — **AP**

1.3 million

Elephant population in the 1980s; **500,000** elephant population today — **New York Times**

2

The number of tiger reserves in India that have no tigers — **WWF**

100,000

Dollars that a single giant bluefin tuna can fetch in auction at Tokyo's Tsukiji fish market — **Time**

Be diverse

ELINOR OSTROM

Professor, Department of Political Science and Workshop in Political Theory and Policy Analysis at Indiana University and 2009 recipient of the Nobel Prize in Economic Sciences

HARINI NAGENDRA

Ramanujan Fellow, Ashoka Trust for Research in Ecology and the Environment, Bangalore, India

The loss of biodiversity has alarming implications for the persistence of humankind, indeed for the survival of life on Earth. Protected areas are the cornerstone of most policy proposals to maintain biodiversity, yet their effectiveness is intensely debated. Furthermore, when the variety of biological life is so rich, interconnected, and diverse, it seems peculiarly shortsighted and inflexible to adopt one single approach to conservation.

Protected areas are now very extensive: more than 220,000 parks cover over 13 per cent of Earth's land. Studies have shown that most have been generally successful at ensuring that large-scale clearings of habitats do not occur within their boundaries. Yet considerable human threats still exist for many of them, particularly those in vulnerable locations with dense human settlements. Park managers face continuing challenges of poaching, illegal harvesting of forest products, and encroachment. Government-managed parks have also been criticized for being costly, inefficient, and exclusivist in their approach, tending to view indigenous tribes and local communities with suspicion and distrust, and ignoring and discounting the traditional institutions and approaches that they may have developed to coexist with nature.

It is also problematic to expect that government preserves will work for all species and habitats, across all environments, geographies and cultures, and across multiple, interconnected scales of space and time. So carefully examining different institutional approaches developed by groups at diverse scales to manage their natural resources can suggest policies for future conservation management.

"We strongly propose that we need a diversity of institutions to cope with the diversity of biological entities and niches."

Garrett Hardin, author of the seminal article on the "tragedy of the commons" in the late 1960s, held that all forms of commonly managed property would inevitably be degraded over time. But we have found, on the contrary, that under appropriate conditions many people do organize effectively to protect natural environments. Some institutions, such as in Switzerland, have recorded histories of persistence over centuries. Others such as in Nepal, have been successful at maintaining forests even in conditions of extreme conflict and armed violence. Developing shared norms and rules that are considered legitimate and fair is crucial for achieving effective management of common property. Local groups in different environments and cultures have developed an incredible variety

of ways to do this using their considerable indigenous knowledge. Yet, many analysts tend to discount this variety.

We strongly propose that we need a diversity of institutions to cope with the diversity of biological entities and niches.

By institutions, we mean the rules used by participants in a variety of settings as they pursue diverse goals. In a field hockey game, for example, diverse institutions are involved. One is the set of rules that the teams use for their game: in a professional match, these will be different from those used by a group of teenagers playing on a neighbourhood field. There will also be referees to observe the play and enforce the rules. Then the rules of a hockey league relate to how many referees are assigned, the signals they should use and the penalties they can impose. The observers sitting in the stadium must follow yet another set of rules, related to who pays for which kind of ticket and how young a person must be to get in for free. So even something as simple as a hockey game has a set of nested institutions related to what happens on the field, in the locker room, in the stadium, and even in the traffic lanes leading to it.

When policy analysts recommend that the "best solution" for preserving biodiversity is the creation of a government agency, they usually expect that such a unit will develop one set of rules even if its jurisdiction is very large and contains diverse ecologies. The challenge is to enable small, medium and larger organizations to develop rules specific to particular ecological settings rather than trying to impose one set for a large domain.

Many policymakers still presume that local users of a resource are incapable of making responsible decisions related to its use. When people do not have long-term stakes in the ecological outcomes for a particular region, it is indeed more likely that they will pursue maximum-harvesting strategies for economic returns rather than the sustainability of a local ecology. Taking away local authority to make some of the rules for the uses of an ecological resource actually reduces the likelihood that individuals will perceive a long-term interest and so may exacerbate the problem of overuse. Careful studies have shown that a core factor affecting the sustainability of forests is whether local users monitor who uses the forest and report illegal harvesting: this is a surprise to many policy analysts and scholars schooled in the Garrett Hardin presumption that users are always trapped in tragic overuse.

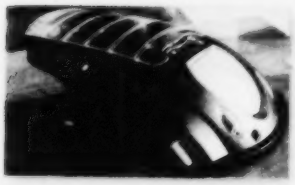
Finding ways of dealing with specific mixes of organisms in a particular biophysical realm is extremely important, and so is establishing mechanisms for oversight. Nesting smaller units in larger ones can increase the probability of long-term protection. Small to medium-scale institutions may be fitted to a specific biological niche, while agencies operating at larger scales can gather scientific information and provide back-up for areas where local participants do not take on the responsibility for protecting biodiversity.

Ecologists have learned that the existence of a diversity of interconnections among a multiplicity of animals and plants does not indicate disorder, but instead points to the flexibility and adaptive resilience of ecosystems. It is important to develop a similarly widespread appreciation of institutional diversity, rather than presuming it is always disorganized and ineffective. Given the variety of life, we must appreciate that no panaceas exist. Multiple and flexible approaches need to exist that can fit local circumstances and adapt to changes in resource conditions and threats to them over time, if long-term sustainability of biodiversity is to be achieved.

products

An eco-flush

The Perfect Flush is a simple device that converts a toilet's mechanism from single flush to dual-flush. It is low cost, easy to install, and can be retrofitted to existing toilet cisterns. A press button unit with half- and full-flush options sits on top of the toilet. When pressed this sends a signal to a device that regulates the cistern's water valve system. Thirty to 50 per cent of the water needed to flush the toilet can be saved with this gizmo which saves the monetary and environmental expense of installing a new toilet.



Solar-powered robotic lawn mower

The RBZG001 is a truly intelligent garden mower. First, it uses solar power to supplement its electricity supply. Second, it can automatically identify its route. The mower has technology that allows it to recognize obstacles and detect slopes and avoiding sliding down them. Third it can deposit its cuttings in a pre-determined location. Now, that puts the fun back into mowing the lawn.

Energy-harvesting soccer ball

What object can be a soccer ball, a portable generator, a community-builder and a global health tool all at the time? Answer: the SOccket soccer ball. This amazing soccer ball generates electricity by being kicked around. Its inner workings allow it to capture energy from impacts with feet, heads, the ground and anything else it might bump into. It generates electricity, which is stored in the ball and used later to power an LED lamp or charge a mobile phone. Currently a prototype, the SOccket got the thumbs up when it was piloted recently at youth programmes in Durban, South Africa, and Nairobi, Kenya.

www.soccket.com

Revolutionary revolutions

The Copenhagen wheel is a bicycle wheel that stores up energy each time the brakes are used, and then gives the power back when the rider most needs it. When the rider applies the brakes, kinetic energy is transferred to electrical energy and stored by batteries within the wheel. The battery power kicks in when the rider needs a boost riding up a hill or a burst of speed in traffic. It was designed by researchers from the Massachusetts Institute of Technology and launched at the 2009 climate change conference in Copenhagen. What's more, the wheel can talk to an iPhone mounted on the handles bars, and provide information on speed, direction, distance covered and air pollution levels.

For electricity, just add water

Recently we've seen a boom in portable solar-powered chargers. Now get set for a portable fuel cell charger. The palm-sized H3 Charger is a fuel cell powered by hydrogen. The hydrogen comes from a replaceable fuel pellet in a so called "tea bag". The tea bag is placed in a compartment inside the fuel cell, water is added and hydrogen is given off. The hydrogen moves up into the fuel cell to make electricity. A phone can be charged directly from the fuel cell using a USB connector, or the electricity stored in a small lithium-ion battery. It's ideal for the outdoors and has great potential for use in developing countries.

Wind up walkie talkie

More and more wind-up or hand-cranked products are coming onto the market. Here's a walkie talkie two-way radio that needs no new batteries and doesn't have to be plugged into the mains to be recharged. All it needs is plenty of elbow grease. Its power is generated by a dynamo mechanism driven by a crank handle. When fully powered each unit provides 1.5 hours of talk time and eight hours on standby. One minute's charging will give two minutes of talk time, so long conversations will give you plenty of exercise too. Roger, Roger, over and out!
www.envirogadget.com

ELIZABETH MARUMA MREMA

Executive Secretary,
Convention on Migratory Species

CONSERVING KINGS

"This, the 2010 International Year of Biodiversity, is the perfect time for us to reflect on our consumption patterns and lifestyle, to find out what we can do in our everyday lives to contribute to saving the world's biological diversity. Sharks would be a good place to start."

Shark populations are collapsing worldwide. International collaboration is vital to conserve and manage them, especially for the highly migratory species that travel the international waters of the world's oceans. After several years of negotiations, the first global agreement for the conservation of migratory sharks was concluded in the Philippines earlier this year in the form of a Memorandum of Understanding under the Convention on Migratory Species (CMS). This is a milestone achievement, not least because it covers several sharks of commercial importance such as the porbeagle and the spiny dogfish which are particularly in demand for their high-quality meat: a porbeagle loin costs up to $33 a kilogram.

It is good to see progress in improving the international governance of sharks, but the challenge ahead is not to be underestimated. Conserving

commercially harvested fish is notoriously difficult, as was again illustrated by the failure to regulate trade in bluefin tuna and various shark species at the Convention on International Trade in Endangered Species of Wild Flauna and Flora (CITES) Conference of Parties in March.

Approximately 71 per cent of our planet's surface is covered with oceans, yet we know very little about the marine environment, which makes it particularly difficult to halt the loss of marine species. Shark populations have declined as a result of overfishing and unregulated fishing. There is a high demand for shark products, such as fins, and large numbers of cartilaginous fish such as sharks are also caught as bycatch by commercial fishing.

You might think we would have excellent data on these large and enigmatic top predators — at least for such hard-to-miss species as the whale shark, which measure well over ten metres in length. But, like the deep sea environment itself, we are still in the dark on issues ranging from their migration routes and the location of their breeding sites to accurate catch data. Indeed the International Union for Conservation of Nature has only been able to estimate the extent of the threat for just over half of the 1,046 known species of the Class Chondrichthyes, which includes sharks, skates and rays. Such understanding as we have of shark biology and numbers is helped by improved technology such as satellite telemetry — but the more we find out, the more evidence appears to indicate that populations are collapsing in most parts of the world's oceans.

Sharks are inherently vulnerable to extinction because they are so sensitive to fishing pressure. They tend to be slow growing, reach maturity late and have few young. The spiny dogfish (Squalus acanthias) has a gestation period of 18 to 22 months and their females only give birth when they are 15 years or older! Dogfish are also highly vulnerable to overfishing since they tend to group in large schools and because the most valuable pregnant females are targeted and often caught in large numbers.

Highly migratory sharks are particularly difficult to conserve because they roam widely in national and international waters, making it necessary for many countries to be involved in their management. International agreements and action plans need to be in place to facilitate collaboration and to coordinate global efforts. Over the years, several instruments have been

developed — such as the European Union Action Plan for the Conservation and Management of Sharks and the Food and Agriculture Organization of the United Nations International Plan of Action for the Conservation and Management of Sharks — but the recent CMS agreement is the first intergovernmental treaty dealing specifically with shark conservation at a global level. Covering seven species thus far — the great white, basking, whale, porbeagle, spiny dogfish, shortfin mako and longfin mako sharks — it has been in force since March. Now the real work starts: we hope to adopt a conservation plan detailing implementation activities at the first meeting of CMS signatories in late 2011.

Consumers should be just as concerned as the over 90 nations involved in shark fishing and trade. The spiny dogfish, for example, is commonly used in the EU for dishes such as fish and chips. In Germany, a curled up slice of its belly is known as "Schiller's locks" after the poet's hairstyle. Shark fin soup is popular in China, costing up to $100 or more for a single bowl. Eating sharks may be bad for health as well as for conservation. Studies from Brazil, Italy and the United States suggest that most shark meat tested contains mercury levels far exceeding national safety limits. UNEP is currently spearheading negotiations on an international treaty on mercury to safeguard human health.

Sharks are also used by many other trades and industries. Shark skin is used as leather for shoes and handbags, and as a substitute for sandpaper by Chinese fishermen (hence the name "sand fish" in Chinese). Shark liver oil is used to coat the hulls of wooden boats in India. Squalene, an organic compound primarily found in shark liver, is widely used by the cosmetics industry and, recently, in producing avian and swine flu vaccines. The list goes on and on.

This, the 2010 International Year of Biodiversity, is the perfect time for us to reflect on our consumption patterns and lifestyle, to find out what we can do in our everyday lives to contribute to saving the world's biological diversity. Sharks would be a good place to start.

There is still hope and time to act. At our recent sharks meeting in the Philippines, I was impressed by the dedication and endurance of the many countries pushing for the adoption of the agreement. Through it we hope that stewardship can be created and that many more countries will join us in our challenging mission in conserving the magnificent "kings of the sea". Bringing the collapse of global shark populations to a halt will be difficult, but not impossible. So let's strive to do it.

awards and events

WORLD ENVIRONMENT DAY

World Environment Day (WED) takes place on 5 June. WED is a global day for positive environmental action and one of the United Nations key initiatives to stimulate worldwide awareness of the environment and encourage political attention and action. WED 2010 is anticipated to be the biggest ever and communities the world over are encouraged take action to care for their local environment. This year's global host for WED is Rwanda, and the theme is 'Many Species. One Planet. One Future' in keeping with 2010 International Year of Biodiversity.

www.unep.org/wed

UNEP SASAKAWA PRIZE

UNEP SASAKAWA PRIZE

Two exciting projects took joint honours in the 2009–2010 Sasakawa Prize for grassroots sustainable development initiatives. Nuru Design was awarded for bringing clean, affordable lighting solutions to rural communities in Rwanda, Kenya and India with portable, rechargeable LED lights that can be recharged by a solar panel or by human power using the world's first commercially available pedal generator. Trees, Water & People won its award for distributing fuel-efficient cook stoves which save families money and dramatically reduce CO_2 emissions. The winners were announced in February and each received a cash prize of $100,000 to expand their groundbreaking initiatives.

www.unep.org/sasakawa/

WORLD MIGRATORY BIRD DAY

Save migratory birds in crisis – every species counts

This year's World Migratory Bird Day (WMBD) was held on 8–9 May. Bird-watching events, educational programmes, lectures, art exhibitions and public events were among the many ways that communities around the world took part in this global campaign. WMBD is an annual awareness-raising campaign that promotes the conservation of migratory birds and their habitats worldwide. Closely linked to 2010 International Year of Biodiversity, this year's WMBD focused on the most globally threatened migratory bird species.

www.worldmigratorybirdday.org/

SHANGHAI WORLD EXPO

EXPO 2010 SHANGHAI CHINA

"Better cities, better life" is the theme of the World Expo in Shanghai, China, from 1 May to 31 October 2010. As part of the United Nations exhibition at the Expo, UNEP's activities will focus on the theme of "urban biodiversity" in keeping with 2010 International Year of Biodiversity. UNEP's events include: the Six Billion Others multimedia project and the Chinese premiere of HOME by Yann Arthus Bertrand; a green economy forum with local entrepreneurs; student debates; and exhibitions on eco-friendly lifestyles, art and sustainability, and biomimicry.

http://en.expo2010.cn/

CLEAN UP THE WORLD

Clean Up the World

Clean up the World is a community-based environment campaign held in partnership with UNEP that inspires and empowers individuals and communities from every corner of the globe to clean up, fix up and conserve their environment. The tag line for 2010 is "Communities Caring for Nature" in keeping with the World Environment Day theme. To find out how you can help with Clean Up the World Weekend, 17–19 September, and learn more, visit

www.cleanuptheworld.org and find us on:

TYLER PRIZE FOR ENVIRONMENTAL ACHIEVEMENT

Cheetah conservation and improving knowledge of ecosystem functions are at the heart of this year's Tyler Prize for Environmental Achievement. Announced in April, the joint winners were Dr. Laurie Marker, the co-founder and executive director of the Cheetah Conservation Fund in Otjiwarongo, Namibia, and Professor Stuart Pimm, the Doris Duke Professor of Conservation Ecology at Duke University, North Carolina, USA. The Tyler Prize is one of the premier awards for environmental science, environmental health and energy.

www.usc.edu/admin/provost/tylerprize/index.html

Tyler Prize for Environmental Achievement

Nature of Value

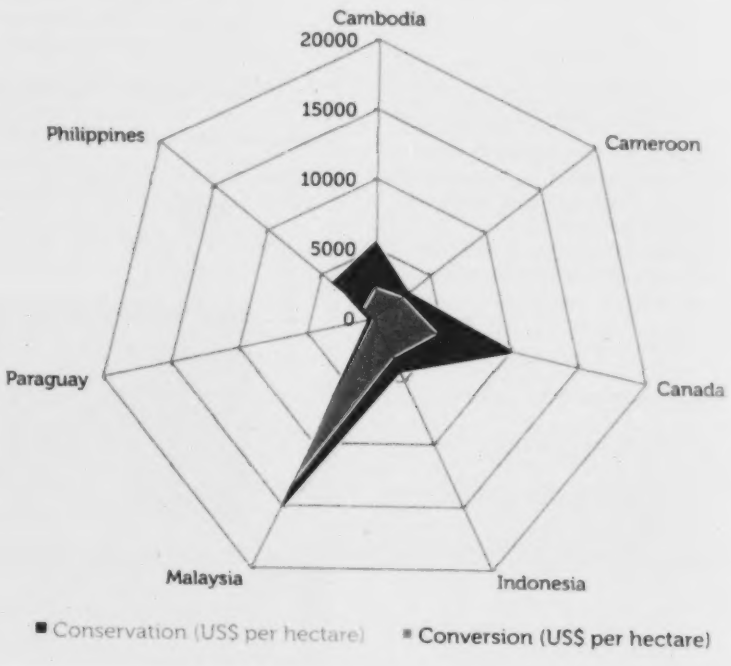
GEORGINA LANGDALE
Communications Officer for The Economics of Ecosystems and Biodiversity Study

Every year the world is set to lose biodiversity and ecosystem services worth more than the amount wiped off banks in 2008's crash. The Economics of Ecosystems and Biodiversity (TEEB) study, hosted by UNEP, estimates that, if deforestation and land use change continue as at present, the world will suffer losses in "natural capital" worth between 1.3 and 3.1 trillion Euros. That is more than the financial capital wiped off Wall Street and London City Banks in 2008, the worst year in their history. And it will happen every year.

The trouble is that natural capital is economically invisible — and that is one of TEEB's central concerns. Biodiversity and ecosystem services have conventionally been seen as public goods: available to everyone and providing enough for all. These services include clean air, fresh water, richness of species, and the many other ecosystem services provided by forests, wetlands, oceans etc. Assuming their abundant and unfettered availability, however, does not reflect reality. The continuing losses of such natural areas are significant, and the resulting impact on human welfare is palpable.

TEEB's long-term purpose is to assemble the best available scientific and economic analysis on the economics of ecosystems and biodiversity, and to communicate it. It aims to help policymakers, administrators, businesses and citizens formulate responses to address the losses around us. For they have power to halt and reverse the losses of natural capital and to improve the well-being of humanity, and especially of the poor.

NET PRESENT VALUE OF BENEFITS FROM CONSERVATION AND CONVERSION (VALUE OF US$ IN 2007)



What is worth more — conserving natural ecosystems or turning them into areas for agriculture, fish farming, or producing timber? A study that compared such conversion with conservation in both developed and developing countries found that conservation — including sustainable production of market goods and services such as timber and other products, fish, and tourism — did better in every case.

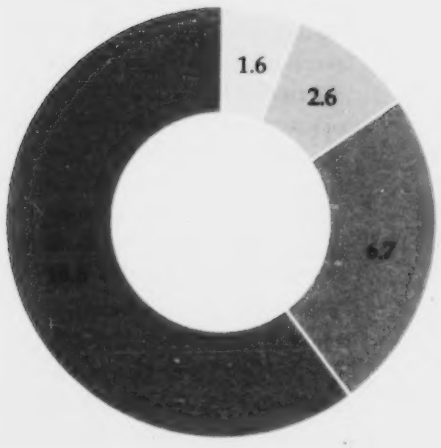
Wetlands provide many valuable services to humanity as a study of Muthurajawela Marsh, a coastal wetland in a densely populated area of North Sri Lanka, shows. The study, which used valuation methods to estimated the economic effects of conserving the wetland, found that some of the benefits to be gained from it — such as fishing, firewood and agriculture — contributed about $150 a hectare to local incomes each year. But the greatest benefits, which were gained by a much wider group of people, came from its ability to treat domestic and industrial wastewater (worth $654 per hectare per year), and to attenuating floods (at $1,907 a year from each hectare). These also avoid the need to pay for expensive technological ways of preventing floods and treating water.

MARKET SECTORS DEPENDENT ON GENETIC RESOURCES

SECTOR	SIZE OF MARKET (2006)	COMMENT
Pharmaceutical	$640 billion	25–50 % derived from genetic resources
Biotechnology	$70 billion from public companies alone	Many products derived from genetic resources (enzymes, microorganisms)
Agricultural seeds	$30 billion	All derived from genetic resources
Personal care, botanical and food and beverage industries	$22 billion for herbal supplements $12 billion for personal care $31 billion for food products	Some products derived from genetic resources. Represents "natural" component of the market.

At first glance biodiversity may not seem to have much to do with industry, but in fact many businesses and livelihoods depend on the genetic resources it provides. Such multi-billion dollar industries as pharmaceuticals and agriculture will be severely hit if biodiversity continues to decline.

EUROPEAN JOBS LINKED TO THE ENVIRONMENT (PERCENTAGE OF LABOUR FORCE)



One in every six European jobs now depends to some degree on the environment, and in most developing countries the link between ecosystems and employment is even stronger.

The TEEB study shows that biodiversity — and what happens to it — directly or indirectly affects everyone. The crisis of its loss can only begin to be addressed in earnest if the value of biodiversity and ecosystem services is fully recognized and represented in decision making. This may reveal the true nature of trade-offs being made, including those between different ecosystem services such as food provision or carbon storage; those between different beneficiaries — private gain by some versus public loss to many; and those at different scales — such as local costs bringing global benefit — and across different time horizons. When the value of ecosystem services are understood and included, what may have looked like an "acceptable" trade-off may appear the reverse. The 2010 International Year of Biodiversity offers an opportunity to define the acceptable and learn the nature of value and the value of nature.

The TEEB Report for Business will be released in July 2010 and the TEEB Report for Local and Regional Administrators will be released in early September. For more information see www.teebweb.org

SPOTLIGHT ON SOLUTIONS

JAMES P. LEAPE

Director-General, WWF International

Last year, the world passed an important milestone as humanity, for the first time, became a predominantly urban species: most people now live in towns and cities. Among the many ramifications of rapid urbanization is increasing isolation from nature and a growing tendency to forget just how dependent we are on the health of the Earth's natural systems.

That is one reason the 2010 International Year of Biodiversity is so important. It is an opportunity to put a spotlight on what is happening to biodiversity around the world, and the implications for our future. It is also a chance to put a similar spotlight on solutions, and to mobilize action.

The Earth's biodiversity is declining precipitously. WWF's Living Planet Index charts a 30 per cent drop in vertebrate populations since 1970, for example; but that is a global average masking bigger losses in the tropics, such as a fall of 50 per cent in tropical forests. And the Intergovernmental Panel on Climate Change tells us that such losses will accelerate as climate change takes hold.

The causes are no mystery. Humanity's footprint on the planet has grown steadily larger and heavier. We are cutting forests for timber, and clearing them to grow soy and oil palm. We are taking far more fish than the oceans can provide. We are pumping billions of tons of carbon into the atmosphere.

We must move biodiversity from the margins of our politics and our economies to the centre. Biodiversity conservation is a moral imperative to many of us — it is also an economic, social and security imperative for everyone. We have to find ways to bring home the simple but powerful fact that the Earth's living systems — forests and deserts, rivers, wetlands and sea grass beds — are the foundation upon which our businesses, our economies, our lives are built.

That is why The Economics of Ecosystems and Biodiversity project sponsored by UNEP and others is so important: it is beginning to calculate the huge economic value that biodiversity provides. Armed with that information, we need to ensure that we manage our lands and waters to ensure the health of their ecosystems — and find ways to lighten humanity's footprint on the planet.

There is a huge role for the private sector. Private certification schemes — such as the Forest Stewardship Council (FSC) and Marine Stewardship Council (MSC) — offer market advantage to those who manage resources sustainably, and are becoming powerful forces: half of the global whitefish sector, for example, is now participating in the MSC system. Some of the world's most prominent companies — including Unilever, Walmart, and Coca Cola — have also started to drive sustainability in their own value chains, engaging suppliers and customers to promote better practices.

But public sector leadership is crucial, since biodiversity is a public good. That responsibility has typically been left to ministers of environment. To be successful, however, it must also become the responsibility of ministers across the cabinet — including ministers of forests, fisheries, agriculture, energy, trade and finance — and heads of state.

Three international events this year offer big opportunities for galvanizing action.

The Tiger Summit: This, the Year of the Tiger in the Chinese calendar, must be the one in which we begin to bring these big cats back from the brink of extinction. Saving the tiger is important in itself, and it will also mean taking care of vast stretches of forest — from India and Indonesia to the Russian Far East — and the rich biodiversity and human communities that they support.

In September, the leaders of the tiger range states gather in Vladivostok for the first ever tiger summit. Their ministers have already agreed on a goal — to double the numbers of the animal (from 3200 to 6400) by the next Year of the Tiger in 2022. If countries now begin to put big commitments on the table, they can inspire a concerted effort that can be a major step forward in conserving Asia's biodiversity.

The Convention on Biological Diversity: When the Parties to the Convention on Biological Diversity meet in Nagoya, Japan, in October, they will agree on new goals. They fell far short of the target they set for 2010, and the most important lesson is clear: they must find ways to inspire action across all sectors of the economy, and all parts of their governments.

Overall goals for protecting and restoring biodiversity must be complemented by concrete, actionable targets that provide clear mandates for implementation. The target of zero net deforestation by 2020, already endorsed by more than 60 governments, is one example. Others could include creating marine protected areas to cover 20 per cent of each country's territorial waters, and elimination of subsidies that drive habitat destruction.

"Saving the tiger is important in itself, and it will also mean taking care of vast stretches of forest — from India and Indonesia to the Russian Far East — and the rich biodiversity and human communities that they support."

The UN Climate Negotiations: Climate change is the transcendent threat to the Earth's biodiversity, so mobilizing a global response is an urgent priority. If we are thoughtless in crafting this, however, it could prove to be a threat in itself. It is important that we reduce emissions from land use in a way that supports conservation of natural habitats, and that adaptation programmes invest, for example, in conserving mangroves and wetlands instead of constructing dams and sea walls.

After the disappointment of Copenhagen, many wonder what can be accomplished when parties to the UN climate convention gather again in Cancun next November. One clear opportunity for action is REDD+ — reducing emissions from deforestation and forest degradation. Thanks to leadership from Brazil, France, Norway and others, there is real momentum for creating a global regime to compensate action on deforestation. Done right, it could be a major step forward in conserving the Earth's biodiversity.

Whether at home on a farm or — like most of us now — in a city, everyone has a vital interest in the health of the Earth's living systems. The International Year of Biodiversity offers the opportunity to bring that interest to the fore, and to begin to get the cause of sustainability into the mainstream of our societies in very concrete ways.

SIMON N. STUART

Chair of the Species Survival Commission of the International Union for Conservation of Nature and Visiting Professor, University of Bath, UK

TIME TO THINK BIG

Does the designation of 2010 as the first-ever International Year of Biodiversity mean anything at all? Is it just a publicity stunt, with no engagement on the real, practical issues of conservation?

Eight years ago 183 of the world's governments committed themselves "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth". This was hardly visionary — the focus was not on stopping extinctions or loss of key habitats, but simply on slowing their rate of loss — but it was, at least, the first time the nations of the world had pledged themselves to any form of concerted attempt to face up to the ongoing degradation of nature.

"One important sign will be the amount of funding that governments pledge this year for replenishing the Global Environment Facility (GEF), the world's largest donor for biodiversity conservation in developing countries."

Now the results of all the analyses of conservation progress since 2002 are coming in, and there is a unanimous finding: the world has spectacularly failed to meet the 2010 Biodiversity Target, as it is called. Instead species extinctions, habitat loss and the degradation of ecosystems are all accelerating. To give a few examples: declines and extinctions of amphibians due to disease and habitat loss are getting worse; bleaching of coral reefs is growing; and large animals in South-East Asia are moving rapidly towards extinction, especially from overhunting and degradation of habitats.

In October the world's governments will convene in Nagoya, Japan, for the Convention on Biological Diversity's Conference of the Parties. Many of us hope for agreement there on new, much more ambitious biodiversity targets for the future. The first test of whether or not the 2010 International Year of Biodiversity means anything will be whether or not the international community can commit itself to a truly ambitious conservation agenda.

The early signs are promising. Negotiating sessions around the world have produced 20 new draft targets for 2020. Collectively these are nearly as strong as many of us hoped, and certainly much stronger than the 2010 Biodiversity Target. They include: halving the loss and degradation of forests and other natural habitats; eliminating overfishing and destructive fishing practices; sustainably managing all areas under agriculture, aquaculture and forestry; bringing pollution from excess nutrients and other sources below critical ecosystem loads; controlling pathways introducing and establishing invasive alien species; managing multiple pressures on coral reefs and other vulnerable ecosystems affected by climate change and ocean acidification; effectively protecting at least 15 per cent of land and sea, including the areas of particular importance for biodiversity; and preventing the extinction of known threatened species. We now have to keep up the pressure to prevent these from becoming diluted.

We at the International Union for Conservation of Nature (IUCN) are pushing for urgent action to stop biodiversity loss once and for all. The well-being of the entire planet — and of people — depends on our committing to maintain healthy ecosystems and strong wildlife populations. We are therefore proposing, as a mission for 2020, "to have put in place by 2020 all the necessary policies and actions to prevent further biodiversity loss". Examples include removing government subsidies which damage biodiversity (as many agricultural ones do), establishing new nature reserves in important areas for threatened species, requiring fisheries authorities to follow the advice of their scientists to ensure the sustainability of catches, and dramatically cutting carbon dioxide emissions worldwide to reduce the impacts of climate change and ocean acidification.

If the world makes a commitment along these lines, then the 2010 International Year of Biodiversity will have been about more than platitudes. But it will still only be a start: the commitment needs to be implemented. We need to look for signs this year of a real change from governments and society over the priority accorded to biodiversity.

One important sign will be the amount of funding that governments pledge this year for replenishing the Global Environment Facility (GEF), the world's largest donor for biodiversity conservation in developing countries. Between 1991 and 2006, it provided approximately $2.2 billion in grants to support more than 750 biodiversity projects in 155 countries. If the GEF is replenished at much the same level as over the last decade we shall know that the governments are still in "business as usual" mode. But if it is doubled or tripled in size, then we shall know that they are starting to get serious.

IUCN estimates that even a tripling of funding would still fall far short of what is needed to halt biodiversity loss. Some conservationists have suggested that developed countries need to contribute 0.2 per cent of gross national income in overseas biodiversity assistance to achieve this. That would work out at roughly $120 billion a year — though of course this would need to come through a number of sources, not just the GEF. It is tempting to think that this figure is unrealistically high, but it is small change compared to the expenditures governments have committed to defence and bank bail outs. It is time for the conservation movement to think big. We are addressing problems that are hugely important for the future of this planet and its people, and they will not be solved without a huge increase in funds.

JANET RANGANATHAN

Vice-President, Science and Research,
World Resources Institute

POLLY GHAZI

Writer/Editor,
World Resources Institute

SHATTERING GLASS WALLS

With such emerging countries as China, India and Brazil now major players on the international stage, it is clear that we live in a new, multi-polar world. But the traditional divide between developed and developing countries isn't the only glass wall that needs to be shattered. The development and environment communities must stop viewing their goals as separate, or even at odds with each other.

As nature declines, so do the many vital goods and services it provides to people. These range from the life-giving — fresh water, food, wood fuel, flood protection — to the life-affirming — recreation and spiritual enrichment. When several hundred scientists examined the health of 24 ecosystem services globally for the 2005 Millennium Ecosystem Assessment, only four had shown improvement over the past 50 years. A startling 15 were in serious decline, while five hung in the balance.

Ecosystem degradation inevitably hits the poor hardest. Three-quarters of the world's poor live in rural communities and rely heavily on nature for their livelihoods. One eye-opening study in India found that while the value of forest services such as fresh water, soil nutrients and non-timber forest products amounted only to about 7 per cent of GDP, it represented 57 per cent of the income of the rural poor.

Given the relentless erosion of the Earth's natural resources, and their importance to poor rural communities, it is hardly surprising that we are not on track to meet the poverty-combatting Millennium Development Goals (MDGs). On current trends, most developing countries are likely to miss many of them. Progress on the Convention on Biological Diversity is also disappointing. Protected area

coverage may have doubled in the past two decades, but many unique habitats are protected only in name. Alarmingly, funding for biodiversity projects — particularly by the World Bank — has fallen significantly in the past three years.

If we are to get back on track to meet these global challenges we need to invest in nature, so as to improve the livelihoods of the poor. A new World Resources Institute report, Banking on Nature's Assets, presents a roadmap for multilateral development banks (MDBs) — key financiers of developing countries — on how to do exactly that, presenting strategies and tools they can employ in mainstreaming ecosystem services into their policies, programmes and projects.

The MDBs are moving slowly in the direction of factoring ecosystem services into decision-making. But to strengthen the business case for investing development dollars in ecosystems, they need to expand the focus of their cost-benefit analysis beyond marketed goods, such as timber and crops, to include nature's regulating and cultural services.

"We need protect nature both for people's, and its own, sake. Action on one front will strengthen outcomes on the other."

Such an approach highlights the value of ecosystem services that often do not show up in a traditional accounting approach. In Costa Rica, for example, pollination by wild bees from adjacent forests boosted coffee yield close to forests by a quarter: protecting forests thus translated into additional yield worth $60,000 a year on just one farm. In Belize, tourism generated by coral reefs and mangroves represented 12-15 per cent of GDP in 2007. In Thailand, the economic value of mangroves rose from around $800 to over $35,000 per hectare when their role in providing coastal protection and fish nurseries was included in a cost-benefit analysis.

Up-front assessment of ecosystem service trade-offs can also improve risk management, leading to more robust and equitable development. Dams supplying power to cities, or irrigation for agriculture, often depend on upstream forests to prevent erosion and reservoir siltation. Yet they can undermine a river's capacity to support fisheries or sustain downstream wetlands that provide coastal communities with water filtration and coastal protection. Similar trade-offs can exist for developing country shrimp farms which increase export markets, but often at the expense of the coastal protection and fish nursery services provided by the mangroves they replace. Palm oil plantations, increasing in South-East Asia, likewise trade off the myriad ecosystem services provided by primary forests — including carbon storage, pollination, and erosion control — against exports.

The MDBs and their partner countries need to build national capacity to design policies and incentives that align the interests and actions of farmers, forest owners, and other users of natural resources with sustaining rather than degrading ecosystem services. One way of doing this is to pay users for ecosystem services, but other possible approaches include:

- land zoning to protect ecosystem service hotspots;
- eliminating perverse subsidies that support activities that degrade ecosystems;
- reforming taxation policies to target those who benefit from or degrade services; and
- certifying such sustainably produced goods as timber, palm oil, and shrimp.

There is concern that the trend towards ecosystem services approaches will mean less money and attention for protected areas. In fact the opposite can be true. We need protect nature both for people's, and its own, sake. Action on one front will strengthen outcomes on the other.

How can governments, MDBs and UN agencies help to scale up ecosystem services-based approaches? While experts on either side of the environment-development divide peer through this glass wall more often these days, the wall itself it is still too often there in development finance institutions and national governments. Most economic and environment ministries are still at an early stage of learning to speak each other's languages.

Such global institutions as the World Bank, UNEP and UNDP can play a crucial role in bridging the divide. They could convene ministers and economists to shape macroeconomic solutions to the linked problems of ecosystem degradation and poverty. They could communicate the business case that healthy ecosystems are fundamental to economic development. And they could provide guidance on investments in ecosystem services, and on integrating the value of natural capital into national accounts — as through UNEP's The Economics of Ecosystems and Biodiversity project.

As October's much-anticipated 10th meeting of the Conference of the Parties to the Convention on Biological Diversity approaches, MDBs and UN agencies should ponder how to take a lead in shattering the glass wall impeding progress on both preserving nature and combating poverty.

2010 UNEP CHAMPIONS OF THE EARTH

CHAMPIONS OF THE EARTH

MOHAMED NASHEED, PRESIDENT OF THE MALDIVES
POLICY AND LEADERSHIP

Convening a cabinet meeting on the floor of the ocean in full scuba regalia was one of President Mohamed Nasheed's well-publicized strategies to draw attention to the threats that climate change poses to the Maldives and other low-lying countries. For this and many other endeavours, the President has been globally recognized for his efforts to curb climate change and raise awareness of environmental issues. For example, he played a leading role in saturating the international media in the lead up to, and during, the Climate Change Conference in Copenhagen in December 2009. President Nasheed has pledged to make the Maldives the world's first carbon-neutral country by 2020, and has tirelessly urged leaders from developing or vulnerable countries like his to break away from carbon-based growth and embrace green technologies for a carbon-neutral future. He has received several awards in recognition of his pioneering environmental work including being named a *Time Magazine* Hero of the Environment in 2009.

DR. TARO TAKAHASHI, EARTH SCIENTIST, JAPAN
SCIENCE AND INNOVATION

Dr. Taro Takahashi has devoted five decades of his life to discovering how carbon moves through oceans, land and atmosphere. His work is the foundation upon which all carbon-cycle research is built. One of Dr. Takahashi's key findings is that most global CO_2 resides in the ocean. He has also made many important observations of oceanic CO_2 absorption and its variation depending on water temperature and season. His research is aimed at understanding the fate of industrial CO_2 released in the air, and developing a better understanding and a more reliable prediction of the oceans' capacity to absorb CO_2 with the aim of assessing the oceans' climate-regulating capacity. With financial support from the Ford Company, which recognized his work with the Ford Award in 2004, Dr. Takahashi has been studying how climate change may alter interactions between land and oceans, as well as the solutions for mitigating these alterations. Dr. Takahashi is currently a Senior Scholar at the Lamont-Doherty Earth Observatory of Columbia University.

PRINCE MOSTAPHA ZAHER, AFGHANISTAN
INSPIRATION AND ACTION

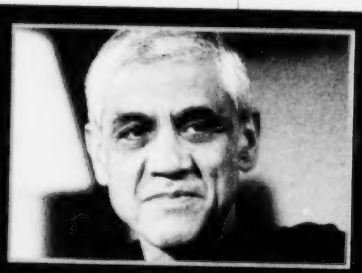
Afghanistan's Director General of the National Environmental Protection Agency (NEPA), Prince Mostapha Zaher, has laid the foundation for a sustainable and peaceful future in Afghanistan. For the past five years, he has worked tirelessly for the environment in a country ravaged by 25 years of war, and continues to find ways to bring clean, efficient and cost-effective solutions to the citizens of one of the world's poorest nations. In 2004, after the fall of the Taliban, Prince Zaher and his family returned to his homeland where he took the reins of the newly formed NEPA. Since then he has turned the royal hunting grounds into a nature preserve open to all Afghans, rewritten the nation's environmental laws, and pledged to improve air quality in Kabul by between 10 and 12 per cent by the year 2012. With Zaher at the helm, NEPA has agreed to allocate at least 3 per cent of its core budget to environmental research and development, and has plans to apply cutting-edge solar and wind technology to address environmental concerns in Afghanistan.

ZHOU XUN,
ACTRESS-ENVIRONMENT ADVOCATE, CHINA
INSPIRATION AND ACTION

Zhou Xun, the most popular actress in mainland China, was named a United Nations Development Programme (UNDP) Goodwill Ambassador for China in 2008 with a special focus on promoting environmental sustainability. Zhou Xun spends much of her time promoting "tips for green living" through Our Part, a campaign she runs jointly with UNDP. Under this campaign, Zhou encourages people to reduce their carbon footprint through simple changes in lifestyle, something that can make a huge difference in a country of China's size. The campaign demonstrates the enormous benefits to be gained if most people in China drove less, unplugged idle appliances, avoided waste and practised the three Rs: reduce, re-use, recycle. Zhou "walks the talk": she works on reducing her own carbon footprint and follows her green tips in her own day-to-day life. She also plants three trees for every 200 km of her own car travel and is planting many more to offset her flights from 2008. Zhou will be the Green Ambassador for the 2010 World Expo in Shanghai.

VINOD KHOSLA,
KHOSLA VENTURES
ENTREPRENEURIAL VISION

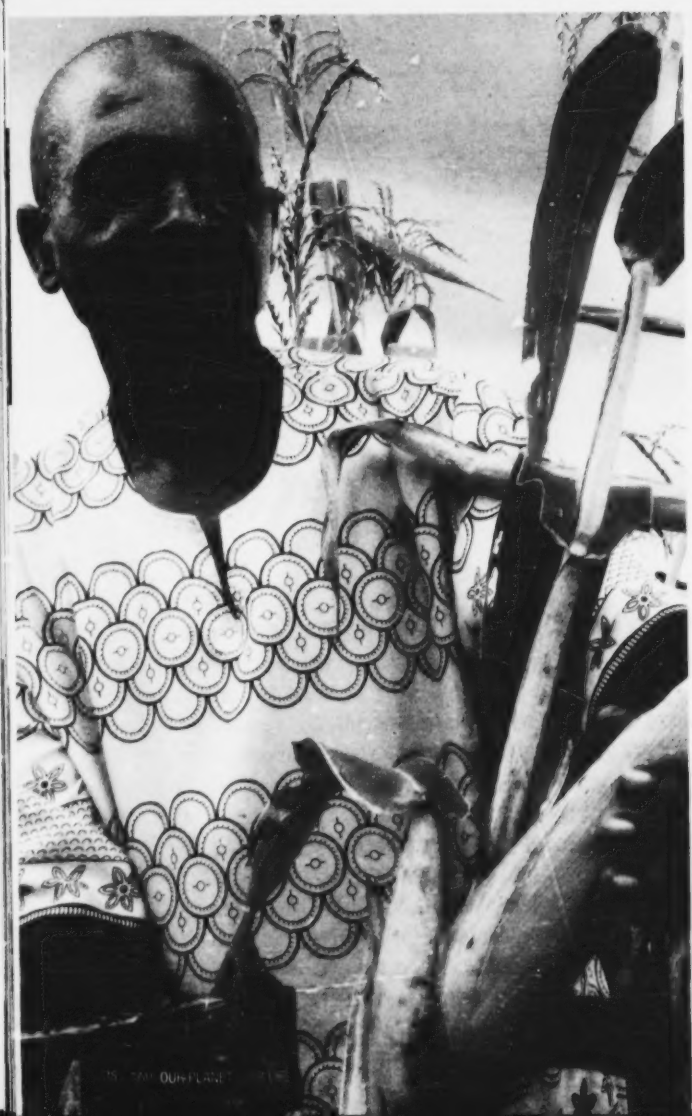
A legendary venture capitalist and the co-founder of Sun Microsystems, Vinod Khosla has been dubbed Silicon Valley's "Mr. Green". In September 2009, Khosla's venture capital firm, Khosla Ventures, announced it had raised $1.1 billion in a "green fund" that would be used to spur development of renewable energy and other clean technologies. The fund came at a time when venture capital investments in green technology were just beginning to recover from a precipitous fall prompted by the global economic collapse in 2008. Of the $1.1 billion, $800 million will be invested in more established technologies while $275 million will be used to make smaller investments in earlier-stage technology companies. The fund is the largest launched since 2007 and one of the largest ever launched for clean technologies. Khosla, whose personal life is carbon neutral, has begun several environmental start-up companies to try to reduce the world's dependence on petroleum. He believes that the burgeoning revolution in oil alternatives will be bigger than the Internet revolution of yesteryear.



BHARRAT JAGDEO,
PRESIDENT OF GUYANA
SPECIAL CATEGORY — BIODIVERSITY CONSERVATION AND ECOSYSTEM MANAGEMENT

Guyana's 45-year old President Bharrat Jagdeo has gained international recognition for his position on environmental issues within his country and on a global scale. Guyana has 40 million acres of untouched rainforest and President Jagdeo has been working on inviting donors and investors to pay for the protection of the forests through the sale of carbon credits, or investments in ecotourism and pharmaceutical discoveries. With the money he expects to generate from this trade, President Jagdeo plans on improving coastal infrastructure to protect the country from potential rises in sea level. He has proposed that the UN Reduced Emissions from Deforestation and Forest Degradation (REDD) programme adopts Guyana's model on forest protection and has encouraged the rest of the world to live in a way "where protecting forests is more economically prudent than cutting them down". He served as Guyana's Prime Minister and Minister of Finance prior to winning the presidency in 2001 and 2006. He is a former contributor to Our Planet.

Hope is evergreen



DENNIS GARRITY

Director General,
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Africa needs to increase its food production dramatically, and to do so in a way that is sustainable, affordable and does not further threaten biodiversity. Already around 30 per cent of its people — some 218 million — struggle with hunger daily and its population is predicted to grow from about 796 million in 2005 to 1.8 billion by 2050. Yet food production per head has been declining and yields of cereals have remained stagnant since the 1960s.

At the same time the size of landholdings has consistently shrunk: four out of every five of the continent's farms are now of less than 2 hectares in size. Farmers are trying to increase yields on

smaller farms with poor soils, amid increasing climate variability and with long-term climate changes ahead. Often, their only hope of producing more food is to expand cultivation by felling forests, posing a major challenge to biodiversity conservation.

Science-based solutions that build on the best of local knowledge and practices — and are truly accessible and affordable — are the only way of ensuring agricultural growth that combats extreme poverty while preventing further deforestation. And hundreds of thousands of smallholder farmers in Zambia, Malawi, Niger and Burkino Faso have indeed shifted to farming systems that are restoring exhausted soils and dramatically increasing both crop yields and incomes. They are applying the principles of evergreen agriculture, which is emerging as a practice of enormous potential not just for increasing crop yields but also for introducing more trees into farms and preventing forest loss. It can be broadly defined as conservation farming that integrates trees with annual food crops and cover crops. Conservation farming is already practised on 100 million hectares of land around the globe. It involves three basic principles: disturbing the soil as little as possible (through minimum or zero tillage); keeping the soil covered with organic material like crop residues; and rotating and diversifying crops, particularly using leguminous species that replenish soil nutrients.

In evergreen agriculture, incorporating trees into farming systems — a practice known as agroforestry — is added to these principles. The trees usually offer many benefits to the farmer and the environment, including providing green fertilizer to build healthier soils and enhance crop production, and yielding fruit, medicines, livestock fodder, timber and fuelwood. They also provide shelter, control erosion, increase biodiversity and offer greater resilience to climate change, while storing carbon.

Fertilizer trees — which draw nitrogen from the air and transfer it to the soil through their roots and leaf litter — have been shown to be able to double average maize yields or more. This equates to an extra three to four months' supply of maize for a family of six, assuming the average African consumes 1.5 kg a day.

"Evergreen agriculture offers an affordable and accessible science-based way of better caring for the land and of increasing smallholder food production."

Maize growing under Faidherbia trees in southern Tanzania

One special fertilizer tree — Faidherbia albida, an indigenous African acacia already a natural component of farming systems across much of the continent — could be the cornerstone of future evergreen agriculture. It exhibits "reverse leaf phenology", meaning that it sheds its nitrogen-rich leaves during the early rainy season and remains dormant throughout the crop-growing period: the leaves grow again when the dry season begins. This makes it highly compatible with food crops, because it does not compete with them for light, nutrients or water during the growing season: only its bare branches spread overhead while the food crops grow to maturity.

In Malawi, maize yields have increased by up to 280 per cent when grown under the canopy of Faidherbia trees. In Zambia and Malawi more than 100,000 farmers have extended their conservation farming practices to include cultivating food crops within agroforests of Faidherbia trees. Extensive observations indicated that maize grown near the trees is

dramatically more productive, and that the soil gets healthier. And in Niger, there are now about 4.8 million hectares of Faidherbia-dominated agroforests enhancing millet and sorghum production.

Evergreen agriculture offers an affordable and accessible science-based way of better caring for the land and of increasing smallholder food production. It allows us to glimpse a future of more environmentally benign farming, with much of our annual food crops being produced within a forest of full-canopy trees.

Most clearing of forests for agriculture is done by subsistence farmers striving to increase their production and incomes, and to escape poverty. As rural population densities continue to rise, natural forests — and the services they provide — are increasingly threatened. A broad adoption of evergreen agriculture offers smallholder farmers the opportunity of improving their land's productivity, thus alleviating the need for further agricultural expansion and potentially leaving more natural forest intact.

Increasing agroforestry also offers the potential to produce forest goods and services on farms, and so further protect biodiversity. And if carbon markets were to become accessible to smallholder farmers, this would result in an ever greater number of trees in agricultural landscapes.

Such experiences with evergreen agriculture and Faidherbia offer the basis for a proposed expansion across Africa. A broad alliance is emerging of governments, international donors, research institutions and international and local development partners committed to expanding this innovative approach to farming throughout the continent.

This article has been compiled with assistance from the World Agroforestry Centre's regional coordinators: Festus Akinnifesi (Southern Africa) Jeremias Mowo (East Africa) and Antoine Kalinganire (Sahel).

Biodiversity: useful links

This page contains links to websites of governments, international organizations, non-governmental organizations, businesses, media and other groups from around the world to help you research issues related to biodiversity. We have compiled these links from our own review of the vast amount of information available on the Internet to help you to find the most relevant sources for your research. *Our Planet* magazine does not necessarily endorse the viewpoints of any of the groups to which we link, and we cannot guarantee the accuracy of the information posted on these sites. Rather, we hope to provide you with a broad range of opinions and perspectives.

www.unep.org

UNEP's 2010 IYB website has a wide range of information including a feature on "species of the day", conservation success stories, examples of technology inspired by nature, news highlights, awareness raising activities and much more.

This site has a particular focus on biodiversity. It looks at UNEP-related programmes and activities, regional initiatives, publications, events and meetings.

This is UNEP's homepage for Ecosystem Management, one of our six priority areas. It has information on UNEP's Ecosystem Management Programme including relevant science, policy, publications, campaigns, news and events. Biodiversity is a key component in ecosystem management.

The GPA aims at preventing the degradation of the marine environment from land-based activities, which are major threats to the oceans' productivity and biodiversity.

GRASP is a joint UNEP and UN Scientific, Educational and Cultural Organization (UNESCO) project aimed at lifting the threat of imminent extinction faced by gorillas, chimpanzees, bonobos and orangutans across their ranges in equatorial Africa and South-East Asia.

The TEEB study is a major international initiative to draw attention to the global economic benefits of biodiversity, to highlight the growing costs of biodiversity loss and ecosystem degradation, and to enable practical positive actions.

UNEP World Conservation Monitoring Centre (WCMC)

A collaboration between UNEP and WCMC that synthesizes, analyses and disseminates global biodiversity knowledge, and provides quality information for policy makers and decision makers.

Biodiversity websites across the UN

T2010 IYB
www.cbd.int/2010/welcome/

This is the Convention on Biological Diversity's (CBD) official page of the 2010 International Year of Biodiversity (IYB). It has information about IYB, celebrations, partners, resources and how to participate.

Convention on Biological Diversity (CBD)
www.cbd.int

The CBD is an intergovernmental treaty that aims to conserve biological diversity, ensure the sustainable use of the components of biological diversity, and ensure fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Convention on the Conservation of Migratory Species of Wild Animals (CMS)
www.cms.int/

The CMS is an intergovernmental treaty that aims to conserve terrestrial, marine and avian migratory species and their habitats on a global scale.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
www.cites.org/

CITES is an intergovernmental agreement that aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival and that counters illegal trade through legally binding resolutions.

Ramsar Convention on Wetlands
www.ramsar.org/cda/en/ramsar-home/main.ramsar/

Ramsar is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

International

WWF — World Wide Fund for Nature
www.panda.org

WWF is one of the world's largest environmental organizations. One of its key objectives is conserving the world's biological diversity.

IUCN
www.iucn.org

A global environmental network of governments, NGOs and volunteer scientists with the aim of conserving the integrity and diversity of nature and ensuring that use of natural resources is equitable and ecologically sustainable.

Bioversity International
www.bioversityinternational.org/

A global non-profit organization that undertakes research aimed at improving people's lives through the use and conservation of agricultural biodiversity.

DARRYL D'MONTE

President of
the International Federation
of Environmental Journalists

Where's the story?

There is far too little coverage of biodiversity in the media — and this is as much due to lack of interest from journalists as to the indifference of editors. Journalists even find it difficult to grasp what biodiversity means. They are used to asking 'who?', 'what?', 'where?' and so on, and the concept doesn't always lend itself to such categorization: climate change or even the hole in the ozone layer are easier to comprehend. But they can scarcely be blamed: a survey conducted a few years ago of 25,000 Europeans found that 70 per cent couldn't define what it meant either. So, I recall American journalists covering the 1992 Rio Earth Summit referring to the controversial draft biodiversity convention as dealing with wild plants and animals — something everyone can understand.

The International Federation of Environmental Journalists (IFEJ) — a global network formed in 1993 — has held several congresses around the world, but biodiversity has never featured as a theme. The International Year should belatedly help to correct this.

This year the IPS International News Agency, in collaboration with IFEJ and other partners — CGIAR/Bioversity International and UNEP/CBD — has launched a global feature service which is looking for new angles on biodiversity. In particular, we are looking for the linkages between natural diversity, food security and climate change. The resulting suggestions for articles provide an illuminating insight into how journalists around the world view the subject.

Some of the ideas were predictable. A Bangladeshi journalist suggested the threat to the Royal Bengal Tiger as islands in the Sundarbans delta are swamped by sea level rise. A more nuanced proposal came from Zambia, detailing the dilemma the country's farmers face as a result of the Convention on International Trade in Endangered Species' rejection of the government's attempt to cull elephants in Game Management Areas because they were trampling on crops. The media loves an "us versus them" scenario, but here the emphasis should have been on how to reconcile these seemingly opposing viewpoints by, for example, employing local communities in managing wildlife, and giving them a stake in it, to compensate them for the loss of traditional occupations.

In much the same vein, a Ugandan journalist proposed a story on how to reconcile the discovery of oil and gas in a conservation area with protecting the wild species of plants and animals which abound there. Here, as in Zambia, preserving wildlife brings valuable income from tourism: Indeed, Uganda's gross returns from conserving its biodiversity are estimated at $64 billion a year — and tourism is its main foreign exchange earner. Yet it is difficult to resolve these conflicting demands, apart from ensuring that if exploiting the oil and gas is essential, damage to the environment is minimized.

Much of the earlier reporting on biodiversity concentrated on the value of traditional plant species as food and medicine. The Convention on Biological Diversity confers rights on traditional farmers who have, over generations, bred plants suited to their specific environments. When companies — including multinationals — use this genetic material for developing their own seeds or pharmaceuticals, these traditional breeders ought to be compensated for the exploitation of their resources. The terms of such payments have provided material for countless stories.

But, once again, journalists must go beyond the obvious and see how preserving biodiversity can enhance agricultural yields. While not necessarily producing as much food per hectare as modern crop varieties, traditional ones can better resist many pests and disease and withstand climate change, while providing good nutrition. In the flood-prone areas of north-east India, for example, traditional varieties of rice can cope with far heavier inundations. And the threat that highly industrialized agriculture poses to wild bees in many developed countries poses problems for the production of honey, which has a huge market.

"... journalists must go beyond the obvious and see how preserving biodiversity can enhance agricultural yields."

Diverse agriculture, and using different crops for various seasons, acts as a buffer against the risk of chronic malnutrition, which affects nearly a third of the world's population, especially tribal people and the poorest rural communities. These people also use a wide range of plants and trees in a variety of ways, to produce or collect for the market and for their own consumption. For the most part, the media has missed this story.

There is also a strong gender dimension. In African countries, for example, the majority of farmers are women, who are aware of how preserving biodiversity yields their families food, fuel and the like and are sometimes referred to as "seed-keepers", passing knowledge down from generation to generation. The role of women in conserving, and sustainably using, biodiversity is specially mentioned in the preamble to the CBD.

Even journalists who find the science around biodiversity somewhat complex can tackle the related cultural issues. Every aspect of traditional societies is linked to the diversity around them. Even their languages reflect it, as does the art to be found in such functional and instrincally beautiful everyday objects as their baskets and fish traps.

If journalists look hard enough, biodiversity can yield a huge range of stories. And if they write them well enough, no editor will turn them down.

"It's dangerous, and its consequences are immediate." Supermodel Gisele Bündchen is describing the loss of biodiversity. "Species are becoming extinct at the fastest rate known in geological history, and most of these extinctions are tied to human activities."

Reportedly the world's highest paid model, Gisele is also a committed environmentalist, who confesses to "being passionate about nature." And this goes right back to her childhood – as one of six daughters of a sociologist and business consultant father and a bank clerk mother in the unremarkable small Brazilian city of Horizontina, close to the border with Argentina.

"I have always been connected with nature," she told Our Planet. "I grew up in a small city and so had the opportunity of close contact with it. I understand we are all connected and that we are all one."

"I really got involved and became an activist," she explains, "after visiting an Indian tribe on the Xingu River in Amazonia and seeing up close the problems they were facing from deforestation and water pollution. Ever since I have been working to draw attention to environmental causes." Last year she was appointed a UNEP goodwill ambassador.

She believes she can "be most effective by raising awareness," adding, "I am happy to be able to use my image to bring attention to these important issues, and to lend visibility to the socio-environmental cause, calling attention to the problems the planet is facing and, hopefully, persuading people to take action." But she has done much more than that.

She and her family, for example, created the Água Limpa (Clean Water) Project, which aims at implementing sustainable environmental management and promotes the recovery of riparian vegetation and the small river basins in the region where I was born." She donates part of the profits from her best-selling Ipanema sandals to protecting the Amazon rainforest and the even more threatened Brazilian Atlantic forest. And she has taken up many other causes ranging from a Brazilian turtle conservation project to the international fight against HIV/AIDS — and made a donation to relief efforts after the Haitian earthquake.

"When we talk about the environment," she says, "our concern should be about everything. We should reduce pollution and stop destroying, but also take proactive action to reforest the headwaters of rivers, save water in our daily activities, save energy and so on."

And in her own life? "I have the habit of recycling, and I try to save water when washing dishes, taking a shower, brushing my teeth. I have solar and wind power in my house in Costa Rica. And that's just to mention some things. Every single change one can make in one's day to day life is useful, even if it seems small. It is so important to be aware of how we are using resources, and to take care of them. With each person doing their part we can make a difference. Whatever happens anywhere in the world has an effect on the whole.

"We must find better ways to live in harmony with nature. I am really worried about what is happening to the planet. You just have to look around to realize that we are in serious trouble. Natural disasters are happening everywhere and more frequently than ever before.

"Biodiversity conservation provides substantial benefits to meet immediate human needs — such as clean, consistent flows of water, flood protection and a stable climate. 2010 is the year to halt the loss of species and the degradation of ecosystems. Take action. Join World Environment Day. This is our planet, our future!"

www.unep.org/ourplanet